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Educators' attitudes toward outdoor classrooms and the cognitive benefits in children

By

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An Undergraduate Thesis

Presented to the Faculty of

The Environmental Studies Program at the University of Nebraska- Lincoln

In Partial Fulfillment of Requirements

For the Degree of Bachelor of Arts

Major: Environmental Studies

Minor: Environmental Education

With the emphasis of: Sociology

Under the Supervision of Dr. Lisa Pennisi

Lincoln, Nebraska
December, 2010

Educators' attitudes toward outdoor classrooms and the cognitive benefits in children

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University of Nebraska, 2010

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Abstract

A case study was organized at a K-5 elementary school in Lincoln, Nebraska. This school is Saratoga Elementary School and is a United States Title I Distinguished School₁ under No Child Left Behind. It has a population of 266 students, with 47% being minority, 1% gifted, and 28% special education (LPS School Profile Brochure). 80% of the student population is eligible for free/reduced meals, implying that it's a school with a lower socioeconomic status. At this school a garden space was constructed and an after school garden club was implemented for this case study. The club had been running since the previous spring semester. Surveys were issued to assess educators' attitudes toward outdoor classrooms and the cognitive (emotional) benefits outdoor education has on children. Students were surveyed before and after club to see if there are emotional benefits to being in an environmental education based club. Students self-assessed their emotional state using emotion stickers. Educators at Saratoga Elementary were also surveyed to assess their attitudes toward environmental education and outdoor classrooms.

It was found that there was not a significant difference in cognitive (emotional) response from the students' pre- and post- Garden club. There was only an increase by 0.02 when quantifying an emotional scale of 1-5. Teacher surveys found that half (50%) of the teachers who responded to the survey did not include outdoor activities in planning their curriculum for the classroom, and half (50%) did not use outdoor activities or recess to alter the behavior of students. All of the teacher respondents

were aware of outdoor space (school garden), but only 60% had utilized the space for an activity. Overall awareness was assessed and it was found that 53% were considered 'aware' of cognitive and/or emotional benefits of nature to children.

Introduction

There is perceived knowledge that time spent in the outdoors is important to children's cognitive abilities. When students are acting unruly in the classroom, teachers may send the students outside to 'burn off some steam'. However, educators may or may not understand the benefits of nature to children's cognitive development or mental restoration. Currently, there is a lot of literature to suggest that the more time a child spends outdoors the better behaved they are.

Nature Deficit Disorder has become a common term for environmental educators. Richard Louv first discussed this in his book, *Last Child in the Woods: Saving Children from Nature-deficit Disorder*. His research suggests that there are negative effects to children staying inside, spending hours on the computer, using video games or watching television. There are many benefits to children spending time in nature, including physical, mental and social. Previous studies show that children may be healthier if they get off the computer and go outside, in regards to the obesity rates, learning and behavior issues. Research regarding the cognitive benefits of nature and outdoor education developed a theory titled Attention Restoration Theory (ART). It is based on a study from Kaplan and Kaplan (1989), and has evolved and been further researched. ART suggests that natural environments have properties that attract involuntary attention, and thus allow a depleted directed attention capacity to recover so that mental fatigue is reduced and restoration is achieved (Laumann, et al. pg 26). In measuring the cognitive benefits of the outdoors in our research, we have measured students' emotional states. Measuring the emotional state would also assess their cognitive stress, implying a benefit to their

cognitive state from being in nature. In limiting the cognitive stress of elementary aged students, it is assumed that they would have better behavior in the classroom.

Whether or not educators have realized these benefits is of concern for environmental educators. Environmental literacy standards are going to be implemented in many public schools around the country and easing schools into these standards will promote a successful program. For this case study, we will be looking at a school in Lincoln, Nebraska.

Nebraska is addressing environmental literacy needs in children by developing an environmental literacy plan in hopes of gaining federal funding. Launched in 2006, The No Child Left Inside Coalition works to introduce the importance of nature and the environment to children and to perpetuate this value to future generations. The No Child Left Inside coalition advocates the important need for children to literally unplug from technology and unearth the vast opportunities nature has to offer. This coalition has spearheaded the No Child Left Inside Act of (2009) which provides incentives for states to develop environmental literacy plans, to encourage teacher training in environmental education (EE), to encourage schools to provide time for EE, and for EE to be integrated across the curriculum. Nebraska's environmental literacy standards aim to fulfill the The No Child Left Inside Act by giving students the knowledge, intellectual skills, attitudes, experiences and motivation to make and act upon responsible environmental decisions as individuals and as members of their community (Nebraska Environmental Literacy Plan). The plan has been developed by Nebraskans through the leadership of the Nebraska Alliance for Conservation and Environment Education. Nebraska's goal is to develop a comprehensive plan that links state educational standards and curricula to provide youth with structured and unstructured opportunities for play, outdoor recreation, learning and scientific study (Nebraska Environmental Literacy Plan).

Currently Lincoln Public Schools has curriculum with environmental connections. Their kindergarten through 12th grade scope and sequence in science for the 2009-2010 academic year

includes units that cover life science, physical science, space and earth, as well as technology and society. Throughout elementary school (kindergarten through fifth grade) topics studied include plants, habitats, embryology, prairies, water and wetlands, seasons, weather, rocks and minerals, recycling, ecosystems and many more. The topics listed may be easily covered in an outdoor setting. With the goal of the Environmental Literacy Standards, topics that are already in the LPS curriculum may be easily accessed and altered to fit into the standards. Instead of just placing the information into the hands of students, Environmental Literacy standards hope to give children hands on experience in order to form an appreciation for nature and the environment. With the implementation of the plan, teachers will foster environmental literacy and a culture of conservation and land stewardship for Nebraska children (Nebraska Environmental Literacy Plan). In order to have a successful plan, Nebraska educators must be aware of the benefits of nature and the relevancy of the Nebraska Environmental Literacy Plan.

In the Nebraska Environmental Literacy Plan, the third element listed was professional development for teachers. The plan illustrates the need to improve teacher's environmental content knowledge and skills about environmental issues. Continued education for formal and informal educators is needed in order to have confident successful teachers, is also illustrated in the Wisconsin study. Teacher surveys in Wisconsin showed that teachers have indicated that lack of an EE background and the belief that EE is unrelated to their disciplines are the main reasons they do not teach about the environment. Training would include how to provide environmental education to a variety of populations, whether that be gifted, special education, early education, people of various ethnic and racial backgrounds, or youth in rural and urban areas (Nebraska Environmental Literacy Plan). The plan also emphasizes inquisitive learning and developmental skills that would allow an educator to facilitate outdoor education lessons. The intent of the Nebraska Environmental Literacy plan is to provide resources, programs, partnerships, information and training opportunities to encourage and support environmental education in schools. The expectation is to do this by providing training opportunities for

teachers, sample lesson plans, examples of outdoor classrooms, and examples of how environmental education can be incorporated across disciplines. In order to assess the need for these training opportunities and more awareness in our education system, a case study is necessary to assess the gap in the attitudes of teachers and the impact nature has on children's development.

Assessing the attitudes of educators on outdoor classrooms and outdoor activities will help us discover whether more training needs to be implemented to achieve the Environmental Literacy standards. Educators may understand why the plan is going into effect, but implementing change into a school system is sometimes a difficult task. Teachers rarely want a change in their classroom, and having to be accountable for another standard is usually unwanted. By implementing the standards and using the current curriculum, teachers will have an easier time changing their activities to meet new standards.

Literature Review

There have been a number of cognitive tests to see how interaction with nature restores the mind and attention for humans. Most of the studies include a pre-assessment and a post-assessment that measures their cognitive distress and fatigue. The time spent in between the two assessments integrates an outdoor experience, either through video, photographs or walks. These outdoor experiences are usually split up into two groups, one being in an urban setting and the other in a natural setting. They use the post-assessment compared to the pre-assessment to see if they were restored throughout their outdoor experience. One of the most basic experiments was done by Berman in 2008, in which they used simple photographs to see which provided more restoration, which concluded a natural setting was more restorative. They continued their study to see if subjects were more mentally fatigued and had to accomplish more demanding tasks, if the results would be similar. They found that

even brief interactions with nature can have a positive effect on cognitive control, which is necessary to recognize nature's effectiveness in cognitive control (Berman et al.).

Other studies have gone further and have taken subjects on walks in nature versus walks in an urban setting (Hartig et al. pg 109-23). Becoming mentally fatigued and then having to walk through an urban setting has been found to be much less restorative than in a natural setting. However, they have also found that your gender and if you were with company makes a great difference (Staats et al.). It was found that being with company in nature was more enjoyable and restorative for females. Researchers have also found that being in a natural setting makes a difference to one's health. It lowered the heart rate of many of the research subjects (Laumann et al.). It was also found that male and female children have different views of nature, being that female children were found to have a very positive correlation with increased attention and their experience with nature (Taylor et al).

Research in regards to educators' attitudes toward outdoor classrooms and environmental education are seldom found. Two studies done in Wisconsin in the mid 1990's illustrate why educators are not comfortable teaching environmental education. Most commonly (25%) teachers perceived environmental education to be unrelated to their subject area, the second most common (24%) response was their lack of background in environmental education (Lane et al). To feel more comfortable teaching environmental education, many teachers would prefer to have an in-service training program (Lane et al).

Research done in Britain shows that teachers rated the amount of teaching of environmental education was low, relative to other subjects (English, Mathematics, Science, etc.). From that same study done by Littledyke, they found that educators had three main attitudes toward environmental education. One was interest in environmental issues and action, stating that those who were involved in environmental action, such as recycling, home energy conservation, 'eco-shopping', organic gardening

and so on, were also more likely to teach about environmental issues in the classroom. The second attitude was interest in environmental education, those teachers that thought of science as a way to finding truths, also showed interest and concern in environmental education (Littledyke).

Therefore, in this study the aim is to illustrate the need for further education of our teachers on Environmental Literacy in order to fulfill the Environmental Literacy Standards soon to be enacted in Nebraska.

Materials and Methods

After implementing a school garden at Saratoga Elementary school in Lincoln, Nebraska, students were recruited into a garden club. Students had garden club once a week, either Wednesday or Thursday. Each day had 20 children registered from grades Kindergarten to fifth grade. Club was planned to have outdoor play and time for exploration in the garden, as well as lessons and literature. Club students were issued Nature Journals. Students were instructed to illustrate their emotions in their journals by placing an emotion sticker in their journal each day both before and after club. To gain accurate assessment from the students, research has found that implementing emoticons², or smiley faces have the best reception. Children are more cautious about expressing how they feel and sometimes are unable to articulate verbally. Also, children can be easily swayed by peer pressure.

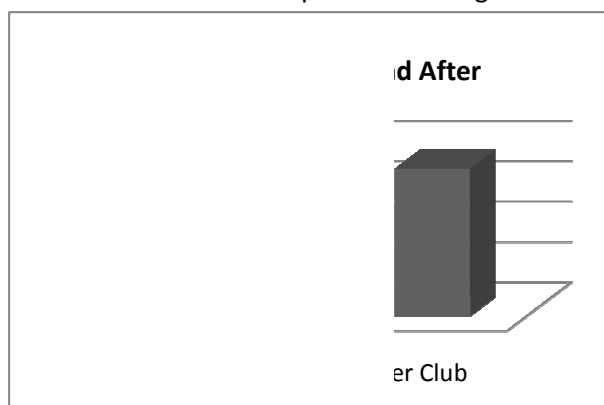
Before club students were asked to use their journals and prompted by the question “How was your day?” and then given the opportunity to place an emoticon sticker in their journal. The stickers were quantified on a scale from 1-5. Before the students would go home, the closing activity would be prompted by indicating how they feel in their journals once again, this time stating “How do you feel now?”. Students were once again able to pick an emoticon sticker to place in their journals. Data was

anonymous and gathered after 100 students were surveyed. Collecting data from 100 students was adequate in calculating whether there was a difference in emotion before or after garden club.

In assessing the second part of the case study, educators at Saratoga were sent an email prompting them to take an online survey about educators and nature. A link to the survey website₂ was provided in the email. Twenty-five educators were emailed, and thirteen of those educators responded. The survey contained 10 questions (See Appendix A). Many of the questions had space available to explain or add a short answer, which provided more detailed responses to questions. The survey gathered information assessing teachers' attitudes toward outdoor activities and the benefits of nature. All information gathered was anonymous and educators were informed of this prior to taking the survey.

Results

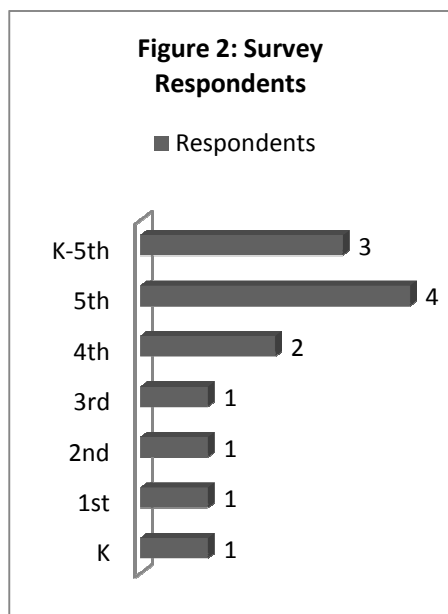
By using emoticons to assess the emotional benefits of nature to elementary aged students, we found that there was little difference in their emotional state before club compared to after garden club (Fig 1). It was often found that emotional stressors caused the students to reply negatively after club. One student wrote in their notebook, after placing a '1' down for after, that it was because she didn't get a garden tool when working in the garden.



Educators who responded (see Figure 2 and Appendix B) to the survey gave us great insight to what teachers understand about the benefits of outdoor activities on children's emotional and mental state. The respondents ranged from Kindergarten to fifth grade, with each grade represented. Teachers that taught grades K-5 taught Speech and Language Pathology, Library, Music and Gifted classes(See

Appendix B). With this data from the teachers, we can make suggestions about their knowledge, awareness and attitudes toward outdoor activities, outdoor and environmental education, as well as environmental literacy.

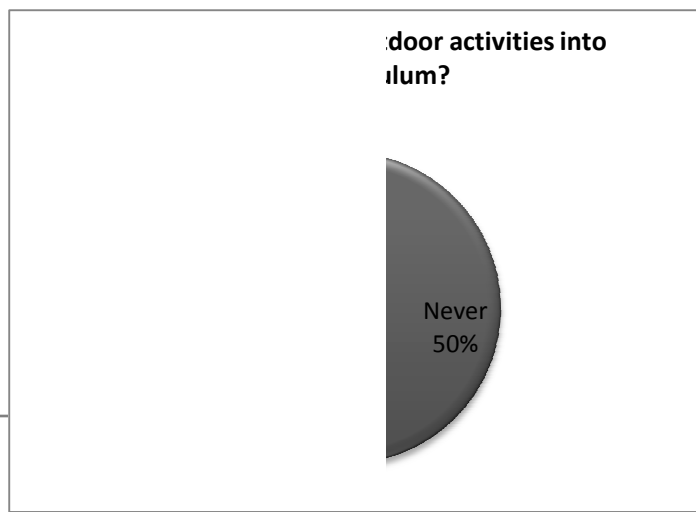
It was found that educators at Saratoga rarely plan outdoor activities for their students. Respondents stated that if they do it is usually to fulfill a need for more physical space to implement an activity. One educator responded, “I try to bring my regular curriculum outside as often as possible.



Subjects like science work well outside, but I often try to bring them outside for regular things like quiet reading, language art time or spelling tests”(see Appendix B). When asked later in the survey what their hesitations were about utilizing an outdoor classroom multiple responses included fear of student allergies. Others stated, not having enough time, no boundaries, too much stimuli, management of behavior and keeping the attention of students. It is apparent from the survey that educators at Saratoga do not see the mental and emotional benefits of outdoor activities

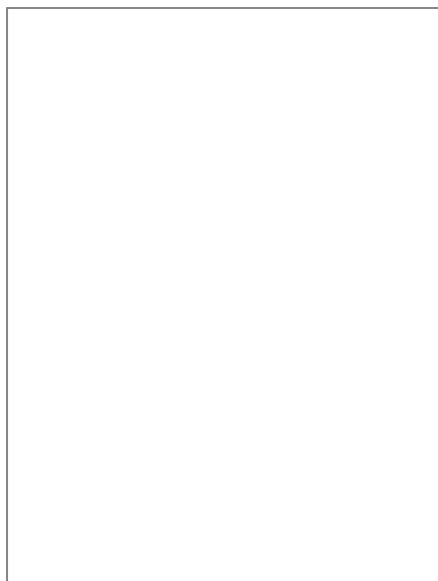
or outdoor classrooms for child behavior. This would imply that further education about the need for environmental literacy is needed for educators at this school.

Continuing through the survey, educators were asked if they use outdoor activities to alter the behavior of students (See Figure 3), and the results were half of the respondents stated “Never”. Only 8% stated that they always use outdoor activities to alter behavior of students. Respondents were given space to explain, and one respondent stated “[I use outdoor activities and/or recess to alter the



behavior of students] if the children get their work done and we have extra time, or if I see the need to go outside and get fresh air we take an extra recess” (see Appendix B). In stating “[...] if I see the need to go outside and get fresh air[...]” that implies that that students need fresh air, and may mean that he or she *does* use outdoor activities to allow the students to expel energy and freshen up. This would be an example of Attention Restoration Theory and using nature to mentally rejuvenate the students. The case study is illustrated in this response, because whether or not teachers understand the benefits of nature is to compare what they already know and connect that to theory. In planning their curriculum, educators rarely planned for outdoor activities (see Figure 4). It’s apparent when comparing the two charts that the data is similar. It is unknown if the teachers that answered ‘Never’ to using outdoor activities to alter behavior, also stated ‘Never’ in planning activities into curriculum because the responses were anonymous. The overall conclusion from this data suggests that teachers do not plan activities because they do not think there it benefits children’s’ behavior.

Overall awareness of the benefits of outdoor space and activities by the teachers at Saratoga Elementary School was assessed by combining answers to the following questions on the survey: How often do you go outside every day? Awareness was considered for those who answered 1-2 times a day

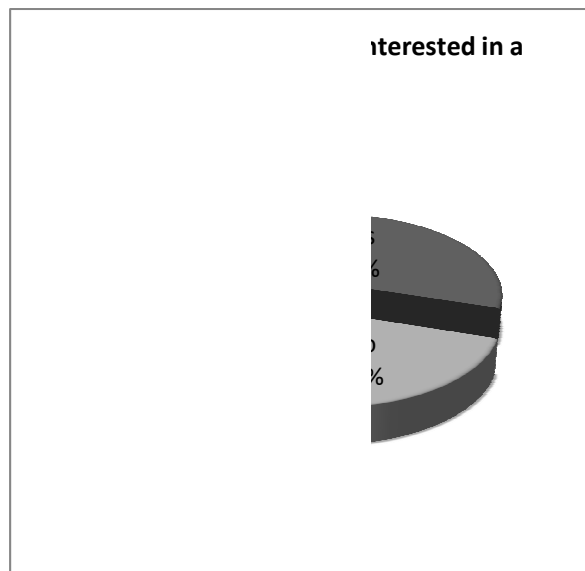


or more; Do you plan outdoor activities into your curriculum? Those that answered sometimes or always were considered aware; Do you use outdoor activities and/or recess to alter behavior? Those that answered sometimes or always were considered aware, and the last question assessed was; Are you aware of the garden on your school grounds? Those that answered yes were considered aware. From this accumulation of data, it was found that 53% of the teachers are aware of the

benefits of outdoor educational activities by their values given throughout the survey (See Figure 5). The

main question to assess the awareness of educators was What are the benefits to an outdoor teaching space? and the results suggests awareness of ART. Out of the thirteen teachers that responded, only one teacher responded by saying, “Engaging all 5 senses of students, calming effects on behavior, exploration for students and inquiry” (see Appendix B). This shows that they do notice a calming effect on behavior which illustrates ART. Environmental literacy standards hope to use exploration and inquiry to form stewardship and value in nature for students. This response suggests that teachers may understand this connection.

The last questions of the survey looked to see if teachers are interested in furthering their education in environmental literacy. For this case study, understanding teachers’ interest in environmental education is very important in assessing the need for more environmental awareness in educators. A total of 80% stated they would be mildly interested in a workshop, this was calculated by combining ‘Maybe’ responses and ‘Yes’



responses (See Figure 6). This is a significant number that suggests there is an interest in teachers wanting to further their education about environmental issues. For this case study, this question is very important. The second part of the question asked what they would expect to learn, in which teachers were allowed a short answer. Most of the respondents wanted to learn how to use the space and how bring any and all subjects outside (See Appendix B). One interesting response was to learn about how to assess students in an outdoor space, this is a real concern that should be addressed under the Nebraska Environmental Literacy Standards.

Discussion

Results from both surveys suggest change is needed in the public school system. This can be found by looking at data from previous research and comparing that to data collected from Saratoga Elementary School students and educators.

Children were not found to be directly affected cognitively by the afterschool nature club. This may be because of the method used to find their cognitive state. Students were asked how their day was right when getting to club and there was a lot of commotion at this time. The students were not in a reflective state, which might have affected their responses. After club, children were once again not in a reflective state. As previously stated, one child commented on their negative response, stating they were upset because they “did not get a garden tool”. Students did not have time to really think about what they were feeling, which greatly affects the results. Club was not always scheduled in a way that allowed children to go outside freely and explore, which is the major principle for ART. I believe to have a successful outdoor education program or club, free time for children to truly explore and reflect is a major component to a successful program, which is also what the Environmental Literacy Standards plan on implementing.

Teacher responses from the surveys were very helpful in assessing the attitudes of educators toward outdoor classroom, outdoor activities and overall outdoor education. Responses were reflective of hesitations found toward outdoor education from previous literature (Lane et al). Confidence in the environmental material is needed in order to reach Environmental Literacy Standards. Because 80% of the teacher’s surveyed showed that they may be interested in a workshop this shows that education about the subject is necessary. Many teachers were hesitant in using outdoor activities because of fears of disobedient behaviors from the children. This is a major misconception because literature suggests otherwise. While trying to conduct a full lesson outdoors may be difficult, allowing children time to

explore and inquire on their own is important to their cognitive growth. Exploration allows positive responses from children and their behavior benefits (Louv).

In order to foster stewardship, conservation, the importance of nature and the environment to children and to perpetuate this value to future generations, environmental literacy standards need to be successful. To do this, educators need to be aware of the impact nature and the outdoors has on children's cognitive development. The value of the environment is something that cannot just be told to our future generations. Children need to feel the dirt and experience the outdoors, inquire about their surroundings, view life cycles and plant life, grow something from a seed and ponder the world. Teacher's need to understand the value of outdoor classrooms and outdoor education, also need to continue their training and education to increase confidence in teaching environmental science to their students and fulfill environmental literacy standards.

Summary and Conclusions

A case study was organized at Saratoga Elementary School in Lincoln, Nebraska to research educator attitudes toward outdoor classrooms and the cognitive benefits of children. To have a successful assessment, a garden space was constructed with an outdoor classroom. Activities were planned that utilized the garden and lessons integrated environmental awareness. Children's cognitive (emotional) states were evaluated during an afterschool club, in which the garden space was used. Educator attitudes were assessed by issuing a ten question survey and evaluating their awareness from their responses. A gap between the actual benefits of nature to children and teacher attitudes toward outdoor classrooms were discovered in evaluating teacher responses to the survey. The goal of the case study was to illustrate this discontinuity and illustrate the need for further education of our teachers on

Environmental Literacy in order to fulfill the Environmental Literacy Standards soon to be enacted in Nebraska.

The case study was successful in showing the lack of awareness toward outdoor education and outdoor classrooms, but not so successful in illustrating ART (Laumann et al). To further this research, a study should be conducted that utilized an outdoor space within the school day (not an afterschool club). The outdoor classroom should be implemented into curriculum and there should be time for exploration and inquiry, which may gather more information on the true benefits of outdoor classrooms in association with ART.

Appendix A: Teacher Survey

The following is a replica of the survey given to teachers:

1. What level do you teach? What subjects/specializations do you have?
2. How often do you go outside with your students each day?

None Once a day 1-2 times a day More than twice a day

Other (please specify)
3. Do you plan outdoor activities into your curriculum?(This does not include recess)

What kind of activities do you plan outdoors? In what subjects do you plan these activities?
4. Do you use outdoor activities and/or recess to alter the behavior of the students?

Never Sometimes Always

What kind of behaviors from the students result in going outside?
5. Are you aware of the garden on your school grounds?

Yes, I've used it before

Yes, but I don't know where it is.

No, but I'd use it.

No and I don't think we need one.
6. In what ways would you utilize a school garden or an outdoor classroom?
7. What kind of hesitations do you have about using an outdoor space with your students?
8. What are the benefits to an outdoor teaching space?
9. Would you be interested in a workshop on the uses of an outdoor classroom?

Yes

No

Maybe
10. If there was a workshop on using an outdoor classroom, what would you expect to learn?

Appendix B: Teacher Survey Responses

1. What level do you teach? What subjects/specializations do you have?

Grade Level	Specializations
Kindergarten	
1 st grade	
2 nd grade	Inclusive Education and Early Childhood
3 rd grade	
4 th grade	
4 th grade	Writing and Social Studies
5 th grade	
5 th grade	All subjects except Social Studies
5 th grade	Special Education
5 th grade	Beginning Band
K-5	Speech Language Pathology
K-5	Library (Reading, Writing, Research, etc)
K-5	Gifted Endorsement, Reading Recovery

*Total of 13 teachers responded.

2. How often do you go outside with your students each day?

None	Only once a day	1-2 times a day	More than twice a day	Other
40% (4)	20% (2)	40% (4)	0% (0)	3

Comments from Others:

1. We don't have a set recess schedule.
2. Every day the children go outside for lunch/recess. We take an additional recess two times a week.
3. I meet with small groups twice a week, so we only occasionally go outside for an activity.

3. Do you plan outdoor activities into your curriculum? (This does not include recess)

Never	Sometimes	Always	Skipped Question
50% (6)	41.7% (5)	8.3% (1)	1

What kind of activities do you plan outdoors? In what subjects do you plan these activities?

1. Field trips, recess, reading, games

2. I try to bring my regular curriculum outside as often as possible. Subjects like science work well outside, but I often try to bring them outside for regular things like quiet reading, language art time or spelling tests.
3. When space or exploration or running is needed. Science and Social Studies
4. We did an activity with measurement where the students had to stretch yarn from end-to-end to get an idea of how large certain dinosaurs were. We also did a messy science activity outside so that it was easier to clean up.
5. Science.

4. Do you use outdoor activities and/or recess to alter the behavior of the students?

Never	Sometimes	Always	Skipped Question
50% (6)	41.7% (5)	8.3% (1)	1

What kind of behaviors from the students results in going outside?

1. If the children get their work done and we have extra time or if I see the need to go outside and get some fresh air we take an extra recess.
2. All students go outdoors, at times students may be limited in choices of activities.

5. Are you aware of the garden on your school grounds?

Yes, I've used it before.	Yes, but I don't know where it is.	No, but I'd use it.	No and I don't think we need one.	Skipped Question
60% (6)	40% (4)	0	0	3

6. In what ways would you utilize a school garden or an outdoor classroom?

1. I know of it but I have not used it.
2. When we were studying worms we went outside to the garden.
3. We used it during Prairie Unit, ecology, and social studies.
4. Plant Lifecycles in the spring
5. When we study plant growth, Prairie grasses
6. I would be much more apt to utilize the school garden if I was a regular classroom teacher. I have small, specialized groups during the week, and we usually need to use items that are found inside to complete our tasks. I'm also limited on time, so just moving everything out and back in that we need would cut into my minutes spent with kids.
7. Plants are part of our curriculum.

*Skipped Question: 6

7. What kind of hesitations do you have about using an outdoor space with your students?

1. Having enough time.
2. No boundaries, lots of extra stimuli
3. None
4. Management of behavior is sometimes more difficult outside
5. Allergies, keeping everyone's attention
6. Perhaps allergies?
7. Some student behaviors might cause me to have concern for the hard work that has gone into the garden

*Skipped Question: 6

8. What are the benefits to an outdoor teaching space?

1. You can use nature to enhance your curriculum
2. Engaging all 5 senses of students, calming effects on behavior, exploration for students and inquiry
3. Fresh air, change in learning environment, physical, allows for exploration
4. Nice weather seems to put students in a good mood. Back when I taught 5th grade in Arizona, we used to analyze soil samples from our school garden, and we did some projects with rocks during a geology unit. They used to beg me to spend time outdoors!
5. I think it gets the students excited to be outside

*Skipped Question: 8

9. Would you be interested in a workshop on the uses of an outdoor classroom?

Yes	No	Maybe	Skipped Question
30% (3)	20% (2)	50% (5)	3

10. If there was a workshop on using an outdoor classroom, what would you expect to learn?

1. How to bring ANY and all subjects outside
2. Different ways to use the space; How can I integrate outside into the curriculum?
3. Ways to utilize classroom; how it ties into current 4th grade curriculum; time management; ways to evaluate and assess students in this environment
4. Activities that could easily be done with an entire classroom utilizing the outdoors
5. How to incorporate it into our curriculum

*Skipped Question: 8

Footnotes

1. Saratoga Elementary has been identified by the Nebraska Department of Education as being in Title I School Improvement, Year 2, for the 2009-10 school year. Even though Saratoga Elementary did make AYP (Adequate Yearly Progress) for the 2008-2009 school year, it takes two consecutive years of meeting AYP goals to be removed from Title I School Needs Improvement status.
2. Emoticons provide each participant with an opportunity for reflection and expression prior to being influenced by other participants views (Universal Education Foundation 2006).
3. Surveys were conducted using online survey machine, www.surveymonkey.com.

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